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50X1

26 January 1955

Dear

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Enclosed are duplicate copies of the progress report on the Rocket for December, 1954.

You undoubtedly have heard the good news from Ed, that yesterday we had some successful flights of the Rocket, which certainly brightens the outlook for this program considerably.

Regards,

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25 January 1955

PROGRESS REPORT
ON
FOUR-INCH ROCKET
FOR
DECEMBER 1954

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During the month of December the investigation of various head plate designs and materials was continued.

After testing single piece head plates from a number of different materials which included plastics, wood, reinforced plastics, and metal channeled plastics, it became apparent that a one piece unit was next to impossible, using the materials which we wanted to use yet keeping the piece at a reasonable size.

At this point we returned to the idea of using a two-piece head plate bolted together and sealed with one large "O" - ring. This, of course, would involve the use of some metal, but it is possible that only a small amount of metal would be required. It is also possible that the required bolts can be made from reinforced plastic. There are plastic bolts commercially available but their strength is at present not known.

A two piece type head plate has certain advantages over the one piece type. The two piece head plate would permit ready access to the powder grains and the probable time delay location. Furthermore, a two piece head plate would permit the use of glued-in nozzles and motor tubes. In the one piece unit, either the tubes or the nozzles would have to be removable to permit access to the powder charge. From a production view point, the two piece unit would be much simpler to manufacture since both pieces could be molded. The one piece unit would likely require some machining. In the two piece unit the problem of delamination of layers of reinforcing material would be eliminated since all the delaminating force would be at the "O" ring seal.

Admittedly, the two piece unit would probably be bulkier and heavier but this additional size and weight is not expected to be prohibitive.

A number of two piece, six motor units were prepared and test fired using glued in tubes and nozzles. It would be fair to say that these tests were reasonably successful although some failures were encountered. In each test that failed the cause was invariably the same. One or two nozzles were blown out as the pressure approached its maximum. This can probably be overcome by placing a retaining ring shelf behind each nozzle.

Two types of glass cloth reinforced plastics were used in the making of these head plates. One was a rigid polyester resin and the other an epoxy resin with a small amount of Thiokol added to give flexibility. Both seemed to work equally well.

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One of the epoxy-glass cloth heads employed motor tubes each canted at an angle of fifteen degrees. This head was fired successfully twice using the same tubes. A polyester-glass cloth head employing straight tubes and nozzles has been fired successfully six different times without apparent damage.

Following successful static testing of the motors described above, the task of building flight test units was begun.

First flight tests will involve only the observation of flight characteristics with little emphasis placed upon exact range or final dimensions.

Plans for Future Work

Fabrication and flight testing of prototypes will proceed with such design changes made as seems appropriate from evaluation of test results. Efforts will be made to achieve stability of flight and consistency of range.

Financial Status:

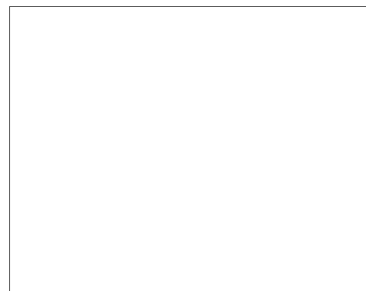
Total Amount of Contract

Expenditures During December 1954

Total Expenditures to 31 December 1954

Total Unexpended Balance

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Posted

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